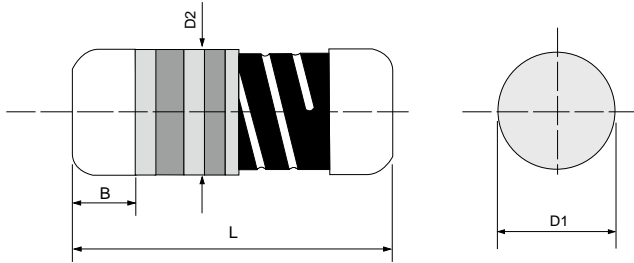


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SFP(V)



## Specifications Per

- IEC 60115-1
- AEC-Q200 Rev. D

## Features

- AEC-Q200 Compliant
- Low temperature coefficient and tolerances
- Excellent stability
- Superior power handling
- Anti-sulfuration test qualified
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency

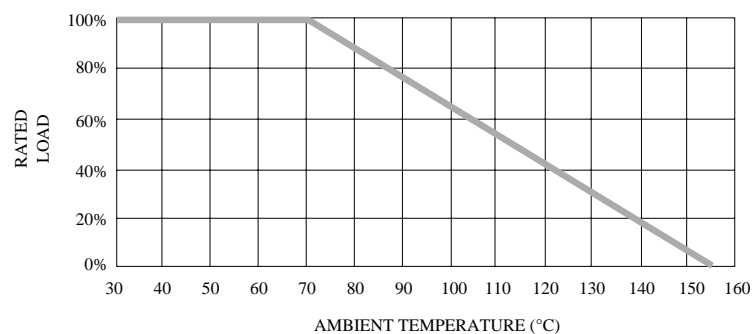
## DIMENSIONS

Type	Body Length (L, mm)	Cap Diameter (D1, mm)	Body Diameter (D2, mm)	Soldering Spot (B, mm)	Net Weight Per 1000 pcs
SFP204V	3.52 ± 0.15	1.35 ± 0.1	D1+0.02/ -0.15	0.6 Min.	17 grams
SFP101V	5.90 ± 0.20	2.20 ± 0.1	D1+0.02/ -0.2	1.0 Min.	66 grams
SFP201V	8.50 ± 0.50	3.00 ± 0.2	D1+0.05/ -0.35	1.3 Min.	186 grams
SFP301V	10.50 ± 0.50	4.00 ± 0.5	D1+0.05/ -0.45	1.6 Min.	446 grams

## GENERAL SPECIFICATIONS

Type	Power Rating (at 70°C)	Maximum Working Voltage	Maximum Overload Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Values
SFP204V	0.4W	200V	400V	0.22Ω	1MΩ	±1% ~ ±5%	E-24 / E-96
SFP101V	1W	350V	700V	0.5Ω	1MΩ	±1% ~ ±5%	E-24 / E-96
SFP201V	2W	400V	800V	0.5Ω	1MΩ	±1% ~ ±5%	E-24 / E-96
SFP301V	3W	400V	800V	0.5Ω	1MΩ	±1% ~ ±5%	E-24 / E-96

## POWER DERATING CURVE



# SFP(V) – Stabilized Film Power MELF Resistor, Vehicle Grade

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## ■ PART NUMBER

Example: SFP204VF33R0TKQTR3K0

SFP204V	F	33R0	TKQ	TR3K0
Type	Tolerance*	Resistance	TC*	Packaging
	F (1%) G (2%) J (5%)	33R <b>4-character code</b> containing - 3 significant digits 1 letter multiplier  <u>OHM MULTIPLIER</u> R = 1 K = 10 <sup>3</sup> M = 10 <sup>6</sup> G = 10 <sup>9</sup>	25ppm <b>3-character code</b> TKQ=±25PPM/°C TKR=±50PPM/°C	<b>5-character code</b> TR = Tape Reel (pieces per reel)  SFP204V 3K0 = 3,000 6K0 = 6,000** 10K = 10,000**  SFP101V 2K0 = 2,000 6K0 = 6,000** 10K = 10,000**  SFP201V 2K5 = 2,500  SFP301V 2K0 = 2,000

\* Listed values may not be applicable across product types or to all resistance values. Please check with us before placing order.  
Please check with us before placing order. \*\*upon request

## ■ TECHNICAL SUMMARY

Characteristics	Limits
Dielectric Withstanding Voltage, VAC or DC	SFP204V: 200 SFP101V: 500 SFP201V: 700 SFP301V: 1000
Temperature Coefficient, PPM / °C*	±25, ±50
Operating Temperature Range, °C	-55 ~ +155
Insulation Resistance, MΩ	>10 <sup>4</sup>
Failure Rate	<5 pcs / 10 <sup>9</sup> Device Hours
Tin Whisker (JESD201 Temperature Cycling & High Temp. /Humidity Storage), μm	<5

\* Not applicable to all resistance values. Please check with us regarding the PPM of specific resistance value(s).

## PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits	
High Temperature Exposure (Storage)	<b>IEC 60115-1 4.25.3</b> 1,000 hours at 155°C without load	<1Ω	±5%
		1Ω to <332KΩ	±2%
		332KΩ to 1MΩ	±5%
	<b>AEC-Q200 REV D. Stress NO.3</b> (refer to MIL-STD-202 Method 108) 1,000 hours at 125°C without load	± 1.5%	
Temperature Cycling	<b>AEC-Q200 REV D. Stress NO.4</b> (refer to IEC 60115-1 4.19/ JESD22 Method JA-104) -55°C 30minutes, +125°C 30minutes, 1,000 cycles	±1%	
	<b>Proprietary test specification FRC-AECQ-180702</b> -20°C 30minutes, +120°C 30minutes, 1,000 cycles (Recommended solder paste composition:96.5% Sn, 3% Ag, 0.5% Cu)	Force of 1kg for 10 secs and without distinct looseness of terminals	
Biased Humidity	<b>AEC-Q200 REV D. Stress NO.7</b> (refer to IEC 60115-1 4.37/ MIL-STD-202 Method 103) 1,000 hours at 85°C and 85% relative humidity with 10% operating power (not over max. working voltage)	< 10KΩ	±1.5%
		10KΩ to <332KΩ	±2%
		332KΩ to 1MΩ	±5%
Load Life	<b>IEC 60115-1 4.25.1</b> Rated load (not over max. working voltage) 1,000 hours with 1.5 hours ON, 0.5 hours OFF, at 70°C	± 3%	
	<b>AEC-Q200 REV D. Stress NO.8</b> (refer to MIL-STD-202 Method 108) 1,000 hours at 125°C with de-rated continuous working voltage (not over max. working voltage)	± 5%	
Resistance to Solvents	<b>AEC-Q200 REV D. Stress NO.12</b> (refer to MIL-STD-202 Method 215) Add Aqueous wash chemical-OKEM Clean or equivalent. Do not use banned solvents.	No visible damage on appearance and marking	
Mechanical Shock	<b>AEC-Q200 REV D. Stress NO.13</b> (refer to MIL-STD-202 Method 213 Condition C) Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen. Peak value: 100 g's, Duration: 6 ms, Velocity change: 12.3 ft/s, Waveform: Half sine	±0.5%	
Vibration	<b>AEC-Q200 REV D. Stress NO.14</b> (refer to MIL-STD-202 Method 204) 5 g's for 20 min., 12 cycles each of 3 orientations, Test from 10 - 2,000 Hz.	±0.5%	
Resistance to Soldering Heat	<b>AEC-Q200 REV D. Stress NO.15</b> (refer to IEC 60115-1 4.18.2/ MIL-STD-202 Method 210) Dip the resistor into a solder bath measured (260±5)°C and hold it for a 10±1 seconds	±0.5%	
Anti-sulfuration test	<b>EIA-977(conditions B)</b> 750 hours at (105±2)°C without load	±1%	±1%
		±5%	±5%

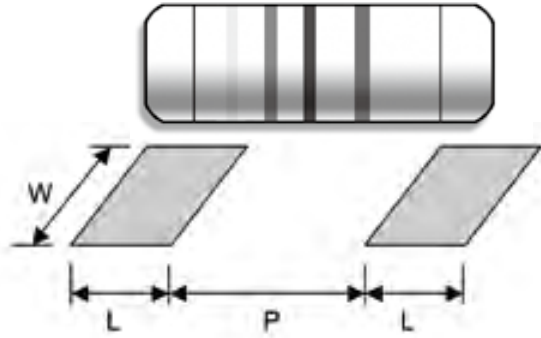
## ■ PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits
ESD	<b>AEC-Q200 REV D. Stress NO.17</b> (refer to AEC-Q200-002/ ISO/DIS 10605) (150pF/ 2000Ohm discharge network) Human body model, 1 positive & 1 negative discharges with 2KV source	±0.5%
Solderability	<b>AEC-Q200 REV D. Stress NO.18</b> (refer to J-STD-002 or IEC 60115-1 4.17) Solder area covered after (235±3)°C/(2±0.2) seconds with flux applied	95% min. coverage
Flammability	<b>AEC-Q200 REV D. Stress NO.20</b> (refer to UL-94) V-0 or V-1 are acceptable. Electrical test not required.	NO flaming
Board Flex	<b>AEC-Q200 REV D. Stress NO.21</b> (refer to AEC-Q200-005) 60 sec minimum holding time.	±0.5%
Terminal Strength	<b>AEC-Q200 REV D. Stress NO.22</b> (refer to AEC-Q200-006) Force of 1.8kg for 60 seconds	±0.5%
Short Time Overload	<b>IEC 60115-1 4.13</b> 5 seconds 2.5x rated voltage(not over max. working voltage)	± 0.5%
Climatic test	<b>IEC 60115-1 4.23</b> 4.23.2 - dry heat: 16 hours 155°C 4.23.3 - damp heat: 24 hours 55°C with 95% relative humidity 4.23.4 - cold: 2 hours -55°C 4.23.5 - negative air pressure: 2 hour 8.5kPa at (25±10)°C 4.23.6 - damp heat cyclic: 5 days 55°C with 95% relative humidity 4.23.7 - DC load: rated voltage at -55°C and 155°C each 1 Min1.	±1%
Load Life In Humidity	<b>IEC 60115-1 4.24</b> 56 days rated load (not over max. working voltage) at (40±2)°C and (93±3)% relative humidity	± 3%
Single pulse high voltage overload	<b>IEC 60115-1 4.27</b> 5 pulses of 1.2/50µs at 10x rated voltage (not over max. overload voltage) with interval of 12 sec.	±0.75%
	10 pulses of 10/700µs at 10x rated voltage (not over max. overload voltage) with interval of 60 sec.	±0.75%
Periodic Electric Overload	<b>IEC 60115-1 4.39</b> 3.9x rated voltage (not over max. overload voltage) with 0.1s ON, 2.5s OFF for 1,000 cycles	±1%

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■ SUGGESTED PAD LAYOUT



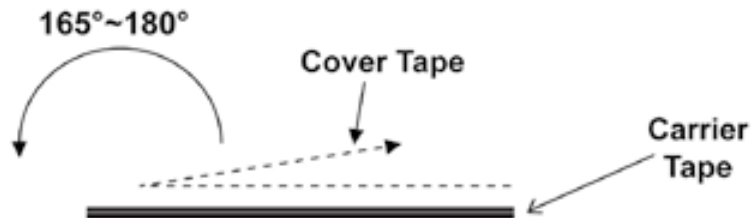
Type	Soldering Mode	Pad Length (L, mm, Min.)	Pad Spacing (P, mm)	Pad Width (W, mm, Min.)
SFP204V	Reflow	1.3	1.6 ± 0.1	1.6
	Wave	1.5	1.5 ± 0.1	1.8
SFP101V	Reflow	2.0	3.0 ± 0.1	3.0
	Wave	2.5	3.0 ± 0.1	3.0
SFP201V	Reflow	3.0	4.9 ± 0.3	3.7
	Wave	3.5	4.8 ± 0.3	4.0
SFP301V	Reflow	4.0	6.2 ± 0.4	5.0
	Wave	4.5	6.0 ± 0.4	5.0

For better heat dissipation / lower heat resistance, increase W & L.

■ COVER TAPE PEELING SPECIFICATION

Recommended peeling force:

SFP204V, SFP101V: 50±5gf SFP201V, SFP301V: 70±10gf



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